

MILLER INDICES AND ZONE AXES KEY

SHOW ALL WORK. Calculate Miller Indices, given the following intercepts:

1. $a' = 2$ $b' = 3$ $c' = 1$

Answer _____

2. $a' = \infty$ $b' = 0.5$ $c' = -2$

Answer _____

3. $a' = 2$ $b' = 3$ $c' = 4$

Answer _____

4. $a' = 0.5$ $b' = 0.\overline{33}$ $c' = 1$

Answer _____

5. $a' = 0.5$ $b' = -0.25$ $c' = 0.\overline{33}$

Answer _____

6. $a' = \infty$ $b' = 3$ $c' = \infty$

Answer _____

7. $a' = 1$ $b' = 5$ $c' = 2$

Answer _____

8. $a' = 6$ $b' = 4$ $c' = 2$

Answer _____

9. $a' = -2$ $b' = 1$ $c' = 3$

Answer _____

Calculate Miller Indices from the following X-ray data:

Maladonite $a = 0.797$ nm, Au_2Bi , isometric

10. $x' = 0.397$ nm
 $y' = 1.198$ nm
 $z' = \infty$

Answer _____

Polarite $a = 0.719$ nm $b = 0.869$ nm $c = 1.068$ nm, Pd(Bi,Pb), orthorhombic

$$\begin{aligned} 11. x' &= -0.715 \text{ nm} \\ y' &= 1.739 \text{ nm} \\ z' &= 0.358 \text{ nm} \end{aligned}$$

Answer _____

$$\begin{aligned} 12. x' &= 1.434 \text{ nm} \\ y' &= 0.289 \text{ nm} \\ z' &= 1.072 \text{ nm} \end{aligned}$$

Answer _____

$$\begin{aligned} 13. x' &= 4.295 \text{ nm} \\ y' &= \infty \\ z' &= 1.603 \text{ nm} \end{aligned}$$

Answer _____

Chalcopyrite $a = 0.525$ nm $c = 1.032$ nm, CuFeS₂, tetragonal

$$\begin{aligned} 14. x' &= 1.049 \text{ nm} \\ y' &= 0.524 \text{ nm} \\ z' &= -2.062 \text{ nm} \end{aligned}$$

Answer _____

$$\begin{aligned} 15. \ x' &= 0.525 \text{ nm} \\ \quad y' &= -1.312 \text{ nm} \\ \quad z' &= 1.032 \text{ nm} \end{aligned}$$

Answer _____

Calculate the zone axis of each of the following pairs of planes. Reduce the axis if a common denominator for the three numbers exists:

$$16. \ (321), (13\bar{2})$$

Answer _____

$$17. \ (210), (02\bar{1})$$

Answer _____

$$18. \ (\bar{4}2\bar{4}), (4\bar{2}4)$$

Answer _____

19. (201), (012)

Answer _____

20. (002), (010)

Answer _____] _____